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JUL 2 2 1946

THE SIGHT-SAVING REVIEW

Spring, 1946

"Let There Be Sight"

Volume XVI
Number 1

PUBLISHED QUARTERLY BY
THE NATIONAL SOCIETY FOR THE
PREVENTION OF BLINDNESS, INC.

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Price $2.00 a year; single copies 50 cents

Published quarterly by the National Society for the Prevention of Blindness, Inc. Office of Publication, 1315 Cherry Street, Philadelphia, Penna.; Editorial Office, 1790 Broadway, New York, N. Y.

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PRINTED IN THE UNITED STATES OF AMERICA

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Responsibility of the Social Agency for Protection of Eyesight*

Miriam Norris

DESCRIBES the cooperative relationship between the clinic social worker and community agencies in sight conservation.

IN retrospect the campaign for the prevention of blindness seems to have proceeded along two fronts. On each of them success has depended largely upon imaginative leadership in an over-all and many-sided educational program which, by determined effort and coordinated activity, has won the intelligent interest and enthusiastic support of a steadily increasing number of persons. The first, and more spectacular in its achievements, has been social action to stamp out potential causes of blindness. For example, there is the better control of communicable and infectious diseases, the improvements in health and nutrition, and the increasing use of safety devices in industry.

The second front, and in many ways the more difficult, has been the stimulation and direction of community efforts to make available adequate facilities for the competent treatment of eye conditions. Along with this has necessarily come the development of the individualized services to enable the patient to use most effectively what medical science has to offer. While no one would venture to say that as yet the necessary medical and related facilities exist, in most communities the more urgent problem now is in the area of case finding and treatment.

The extensive testing of the eyes of school children and industrial workers has been instrumental in revealing many eye defects which would not otherwise have been recognized. We are still confronted, however, by the fact that many conditions are not discovered until

* Presented at 1946 National Conference of Social Work, Buffalo, N. Y.

it is too late for treatment to be successful. We are discovering, also, and often with a sense of frustration and disillusionment, that the discovery of an eye condition, even where there are adequate facilities for treatment, does not necessarily mean either that the individual will be advised to have an eye examination or, having been examined, that he will follow through on treatment.

Recognition of the latter aspect of the problem has resulted in the increasing use of medical social workers in eye clinics, but no one is more aware than the eye worker herself of the limited service she can give unless the knowledge which she has gained can be utilized in ways which will be meaningful to others, and which thereby will be extended to much larger numbers of persons than the patients with whom she comes into direct contact. I am particularly grateful, therefore, for the opportunity which this meeting offers us to consider together some of the responsibilities which fall to the lot of the case worker in the non-medical agency, both in regard to case finding and social treatment. For in both case finding and social treatment, it is the case worker in the non-medical agency who is in the strategic position with respect to large numbers of persons who may be in need of eye care. The focus of the present meeting on finding ways of making information on visual functions better understood and integrating eye services into programs of all agencies seems to me, therefore, to be particularly significant at this time when there is so much interest in the whole field of rehabilitation.

In relation both to case finding and treatment, two diagnostic groups immediately come to mind: glaucoma (hardening of the eye ball) and strabismus (cross eyes). In both of them early discovery and treatment are very important, and both of them afflict great numbers of persons. Both have far-reaching emotional implications for the individual whose persistent and unfailing cooperation is needed in long-time medical treatment, often with uncertainty as to the final outcome. In both, the patient inevitably suffers at least temporary disabilities which may be beyond his power to cope with successfully unless he can be given help. Often he may require the assistance of one or more agencies in the community.

These diagnoses differ strikingly, however, in the degree of concern with which they are regarded, even by the medical profession,

for while the general practitioner is learning to take glaucoma seriously, treatment of strabismus is still regarded by many physicians as a non-essential or even a luxury. It is small wonder, then, that this same misconception is so widespread on the part of the general public! But this very lack of concern imposes a responsibility upon any professional worker and particularly the one who is in a position to observe the preschool child. For it is in the preschool years that strabismus is treated most effectively.

I am impressed repeatedly, however, with the fact that relatively few persons even among professional case workers feel comfortable in working with patients who have even a slight visual handicap. Part of this discomfort is due, no doubt, to lack of basic understanding of visual functions and the technical and obscure language in which much of the information is clothed. I suspect that emotional factors on the part of the worker herself, and often her own unrecognized fear of blindness may serve to set the individual with a visual handicap so apart that he loses his identity as a person and becomes characterized too often as "the patient who is going blind."

This second aspect of the problem would appear to be related, not to the area of technical information in regard to visual functions, but to professional competence and understanding of the case work process. Implicit in the discipline of generic case work is an awareness by the worker of the part her own attitudes play, and some ability to differentiate her feelings from those of her client. Only in this way can she see him as an individual and help him to make use of the services which are available to him. The fact that emotional disturbances so frequently play a prominent part in the response to and treatment of eye conditions would seem to offer a particular challenge to the case worker, who is herself trained as a specialist in this area.

In this connection one should mention the fascinating material which gives evidence of the rôle of emotional factors in the etiology of glaucoma, as well as other conditions in which they are recognized as uppermost—as for example, hysterical blindness. More generally recognized by the case worker is the need for an understanding of psychological reactions to treatment. For some patients, intensive case work help is needed before they are able even to begin to make effective use of doctor or clinic. All patients need to feel understood

by someone who appreciates the implications which their disability holds for them.

Recently we had a striking example of losing sight of an individual when an agency placed a patient with glaucoma in the category of blindness:

> Robert M, a 23-year-old discharged veteran, was referred to the social worker in the eye clinic in September, 1943, by the medical social consultant of the American Red Cross. The patient, while he was hospitalized for injuries received on maneuvers, had been discovered to have glaucoma by an Army physician; subsequent to surgical treatment of eye condition, he had been discharged from the Army. He sought help from the Red Cross home service worker who had known the family situation from a study she had made earlier in regard to a dependency allotment. She had reported to her medical social consultant that the family was unable to help the patient financially beyond providing a home for him during the time of any necessary treatment, and arrangements were made for his free medical care at the University Clinics.
>
> On his first examination in eye clinic, Robert, still in uniform, with great urgency told the worker that he hoped "the doctors would get all this over with" quickly so that he could enlist and return to the Army. He wished the worker to talk with the Red Cross, since they would understand how a soldier would feel. They already knew, too, how impossible it was for him to be "a burden to his family" and how much they needed his allotment.
>
> Many of the details of the cooperative case planning are not pertinent to this discussion beyond the fact that the Red Cross worker, through her understanding of the medical implications of Robert's disease and the requirements of long-time treatment, was able to make him feel comfortable about the family responsibilities. Only then, with the clinic social worker's help, was he able to work through his anxieties over his eye condition enough to be able to begin to follow the doctor's recommendations.
>
> After two years of combined medical and surgical treatment Robert's eye condition was sufficiently stabilized to permit consideration of vocational plans. Visual acuity was normal and there was no seriously crippling restriction of visual fields. Aptitude tests were given, and he applied for further educational training under the G.I. Bill of Rights. The doctors sent a detailed report to his counsellor at the Rehabilitation Ad-

ministration, giving the diagnosis, and explaining the need for continued medical supervision. The report then went on to say: "Robert's visual acuity is good, and the only type of work which we recommend that he not attempt to engage in is anything done at low levels of illumination. Other than this . . . it is our feeling that his own wishes and inclinations be the determining factors. A moderate amount of book work will do no harm."

You can imagine the incredulity with which we learned, at the next clinic visit, that Robert was being instructed in Braille! It seemed fantastic to hear the counsellor explain, in all seriousness, that since glaucoma was a progressive and incurable disease it was better to face the inevitability of blindness realistically at the outset, and use this period as one of training for the future! We agreed as to the "training for the future" but thanks to medical skill and to community resources it will be a future for Robert as a sighted individual.

I wonder though when, if ever, Robert will be able to overcome the effect of this misinterpretation of the medical recommendations. Even though he protested his counsellor's insistence upon Braille, much of his earlier anxiety has reappeared, and he is very fearful of doing anything which may "harm his eyes." He will need much supportive help by the clinic social worker in moving ahead realistically in vocational planning and in again taking his place as a reasonably independent person. The medical gains which have been made will be of little avail and the real objective of medical care lost unless Robert can become progressively more independent, unhampered by the paralyzing fears which have again gripped him. But this can be achieved only if his vocational counsellor, too, really believes that there is no physical limitation which *need* stand in the way of his vocational development. The clinic worker at best can go only a limited way, with the fate of the individual often dependent, as in this case, upon the understanding —or lack of it—on the part of agencies in the community. Hopefully, the discussion this afternoon may give us some clues as to better ways of broadening the base of this understanding.

The second diagnosis of which I wish to speak is strabismus. Here, as in glaucoma, successful treatment depends upon early discovery and consistent following through of medical recommendations over a period of years. Here again, physicians often seem

unaware of the values and imperative need for early treatment. Too often even the well-qualified pediatrician merely notes the presence of strabismus in the course of his examination and does nothing further. Often, one suspects, this may be due to his realization of the practical difficulties in obtaining the necessary treatment and his recognition, too, of the many social and emotional factors which may be involved. For example, he may fear that parents will be resistant to the recommendation for glasses and occlusion, or that they will not be able to follow through on treatment; or he may feel that if attention is directed to the defect it will heighten the emotional factors which may already be operating to the detriment of the child. Perhaps it may be because the end results of failure to get treatment are not as dramatic as in glaucoma, where fear of blindness gives urgency to the recommendation for immediate care. If these factors operate in the case of children who are under regular medical supervision, one cannot be surprised at the even greater disregard of the condition on the part of the general public, where old wives' tales all too frequently pass as scientific information. Once again we must depend upon the social worker in the non-medical agency to spread the gospel! The current emphasis on adequate visual tests prior to placement in industry and the disqualification for many jobs of persons without adequate vision in both eyes, are bringing some awareness of the seriousness of the handicap of the "one-eyed" person. I doubt, however, if many persons realize that by far the greatest cause of that disability is the failure to give adequate treatment to a patient with strabismus early enough to establish useful vision in both eyes.

Recently the Clinics had a striking illustration of this failure on the part of both the medical and social agencies who had worked with the H. family:

> Mr. H, who had only recently moved to the city, asked for help in planning for the care of his six children, ranging from two to nine years of age, during his wife's emergency hospitalization. Temporary placement of the children proved to be the only possibility and as a part of the routine physical checkup required by the children's agency, it was noted by the pediatrician that two of the children, Marion, aged eight, and Edward, aged three, had a noticeable squint.

During Mrs. H's hospitalization, the medical social worker records as follows: "Worker's service in this case to date has been limited to arrangements for temporary care of the children. It is her impression, however, that patient may need help from a family agency in the management of her home since she has no relatives in this city and has previously had to rely on her mother's help. Mr. H is particularly absorbed in his work at the present time in an attempt to provide adequately for the family (his income had previously been noted as considerably below budgetary requirements for a family of this size). Patient seems to have real affection for her children and accepts them rather placidly, individualizing them with considerable awareness of their needs. It is worker's impression that patient could use constructively the help of a family agency. She should also be encouraged to bring Marion and Edward in for an eye examination as soon as she is able to do so."

Note particularly the recommendation for eye examinations for the two children. If this worker had not had some previous experience with patients with eye conditions, I doubt if she would have followed through as promptly or been as sensitive to the factors that needed evaluation in the thinking through of plans. Note also the suggestion that further case-work service by the family agency may be needed by mother in meeting her heavy responsibilities, that her attitude toward her children is warm, and that she is actively interested in getting help in planning for them. I stress these points, for realistically one would hesitate to embark on a medical plan as exacting in its demands as this without weighing carefully the mother's attitude toward and ability to follow through on treatment.

Prior to arranging for eye examination for the two children the clinic social worker talked with the mother further about their eye condition and learned that she had had real concern, especially about Marion, the eight-year-old, who was self-conscious about being called "cross eyes" in school, but that she had known no way of getting care. She learned, too, that the mother had been told by a case worker in a family agency, prior to her coming to Chicago, that nothing could be done until the children were "older" and that they would probably "outgrow" the condition. It was at this time, also, that the mother told her that still a third child, George, aged nine, had difficulty seeing the chalkboard in school and that she feared

that the three other children also had a tendency to "cross eyes." So eye examinations were arranged not for the two children but for all six, and for mother as well!

It is of interest that father had "cross eyes," which were corrected by surgery, but too late to give him useful vision in both eyes. This may explain mother's concern over the children's condition, a concern which she had already taken the initiative in discussing with the workers both of a family and a children's agency in another city, and with at least two doctors, all of whom had apparently told her that nothing need be done, at least until the children were older. What a tragedy that for the four older children treatment is being started so late!

On examination George was found to have only 20/200 vision in one eye, and occlusion of the "normal" eye was recommended. Placement in a sight-saving class was arranged, since it was the only plan which would make covering one eye reasonably acceptable to a nine-year-old, even if he were the stable youngster he seems to be, and really interested in "getting to see right."

The opening of sight-saving classes to such children seems so obviously sound that it is easy to take it for granted, forgetting the effort that has gone into the development and extension of the program. Without such a resource, treatment would be immensely more difficult if not almost impossible for many children.

The picture for Marion, the eight-year-old sister, is complicated by emotional factors which are not apparent in the case of George. For one thing, the squint is more pronounced, and she is sensitive about being called "cross eyes" by other children. Fortunately, it may not be necessary to recommend occlusion if her eyes continue to respond to correcting lenses, but already there are behavior problems which are sufficiently marked to be of real concern to the family. The child's petulant disobedience and excessive demands for attention have become a problem to her mother. Furthermore, the mother herself is becoming defensive because she feels that the father blames her for "discriminating" against the child.

It is not necessary to go into detail in regard to the other children to have some appreciation of what eye care for this family will involve in terms of frequent clinic visits, frequent changes of

expensive glasses with the shatter-proof lenses that are so essential if vision is to be safeguarded, possible eye surgery, special school facilities, and orthoptic training—to mention only the more obvious.

But provision of these facilities for treatment will be of little avail without the continued cooperation of the family agency. Equally important with the financial assistance and help in practical planning is an understanding by the family case worker of the way in which emotional tensions are heightened by these medical problems, and a recognition of the mother's need for supportive help in "carrying on" successfully in her relationships with the children. The clinic social worker can "stand by" to facilitate the working out of treatment plans and to interpret medical recommendations, but her efforts will be futile unless the family agency and the school can be helped to see their continuing rôle in a total plan. For this family it will be a long-time plan and "long time" in this case means *years*, though the period of intensive case work may be relatively brief.

In my experience the clinic social worker can usually expect the cooperation of other community agencies once she has given them real understanding of her patient's needs. Less frequently, I think, does the non-medical worker take the initiative in making use of the services the medical social worker can offer. I wish most sincerely that other professional workers would feel more free in consulting the eye worker, not only in regard to an individual patient but in gaining a better general understanding of the meaning of the various handicapping eye conditions and the facilities and methods of treatment. The eye worker is only too glad to give this service for she knows from her own repeated experience the values which will come from better informed related professional groups. Only through an increase in our mutual understanding can we find ways of reaching those in need of eye care and effect more adequate and better coordinated service for them.

We in the medical setting do not minimize the importance of skilled medical care in our frank acknowledgment that for many patients it is only a fraction of the total service which is required. But we have learned that often the best of medical service is of little avail without the significant contribution which can be made by other community agencies.

Basic Eye Information in the Training of Workers*

Eunice W. Wilson

EMPHASIZES the necessity for including eye information in the training curricula of the various professions concerned.

ALL community health and welfare agencies have not only an opportunity but a responsibility to participate in preventing blindness and in conserving vision. This participation, however, cannot be accomplished unless social workers, public health educators and teachers have knowledge about the ocular as well as the physical conditions which may produce blindness or visual impairment. They must realize the necessity of early diagnosis and adequate medical treatment in all eye difficulties if sight is to be conserved. The wide variety of conditions which may affect the eye makes it impossible for medical social workers in eye clinics and the relatively small number of social workers in prevention of blindness programs, throughout the country, to know and be in personal touch with all of the individuals who are in need of such diagnosis and treatment.

Instruction is essential, therefore, if workers in community agencies are to cooperate with ophthalmologists in their efforts to conserve vision by every possible method. This instruction for the above groups should include, as a minimum, information on the following points:

1. Diseases of the eye itself which may result in blindness without medical treatment; e.g., glaucoma, interstitial keratitis, gonorrheal ophthalmia, trachoma, uveitis, tuberculosis.

* Presented at the 1946 National Conference of Social Work, Buffalo, N. Y.

2. Diseases or conditions of the eye in which effective treatment may be given to restore vision or correct serious visual loss if diagnosis is made promptly and treatment followed intelligently; e.g., senile cataracts, congenital cataracts, strabismus, toxic amblyopia, and separated retina.
3. Systemic diseases of the body which may present or be associated with possible eye complications; e.g., diabetes, cardio-vascular disease, and arthritis.
4. Medical resources available for treatment of eye conditions within a given community, including the location of sight-saving classes.
5. The possible medical social resources available for consultation purposes in relation to a particular patient's needs; i.e., whether the eye clinic in the community has a medical social worker, or whether there is a private or public agency with a prevention of blindness worker who can be approached for this service.
6. The social implications involved, not only in blindness, but also in partial loss of vision.

Lack of information on these points is all too obvious to medical social workers in eye clinics and prevention programs who are attempting to interpret a patient's ophthalmological condition to social workers and others in community agencies. Children with strabismus are frequently seen in eye clinics for the first time when they are 8–10 years old, yet they have been in school since they were six, under observation of the school health system. The need for glasses for school children is not discovered in many cases until the child has had his vision test in school, which is not done routinely in the first year of school. Adults appear in clinic with serious visual damage due to glaucoma or diabetes which might have been prevented if the social worker in a community agency had been aware of help which might have been offered to the patient earlier. The medical social workers who are not trained in eye work as well as the social workers in the non-medical field have little knowledge of many aspects of eye care. Too frequently they think the primary purpose of an eye clinic is to refract and to prescribe glasses. They have not experienced, with a patient, the seriousness of diseases of the eye nor shared his apprehension when he is confronted with eye surgery or long-term treatment; nor have

many of them assisted a patient, in his adjustment to blindness, when medical treatment has not been effective.

In discussing methods of providing information to social workers, three divisions of workers have been made:

1. The social worker who is preparing in a school of social work for practice in the non-medical field.
2. The social worker who is preparing in a school of social work for practice in the medical field.
3. The social worker without formal social work training who is working in an in-service training program in a social work agency.

In 1941 the Education Committee of the American Association of Medical Social Workers prepared for the American Association of Schools of Social Work an outline on medical and public health information which was suggested for the curriculum in schools of social work, for all social workers in their first year of training. In the course on medical information, ophthalmology was one of the sixteen subjects suggested for coverage. Although this outline is in general use in the schools of social work, there is flexibility in its application and, as a result, lectures on ophthalmology are not necessarily assured for every student. Furthermore, under the general subject of ophthalmology the topics suggested for discussion are few; namely, "refractive errors, infectious diseases, growths, others" which may mean a wide variation as to the content which is presented. In the other fifteen subjects suggested in the curriculum on medical information, however, there are several subjects outlined which can include the relationship of the eye to the disease or medical material under consideration; e.g., cardiovascular disease, genito-infectious disease, malignancy, surgery, and the topic of infant and child health. Whether these subjects do include any reference to eyes probably depends largely upon whether the instructor is conscious of the importance of doing so, or whether someone particularly interested in prevention of blindness and sight conservation has requested that such information be included.

Since limitations of time in the educational process make it impossible for ophthalmology to be extensively covered in the

specific lecture hours allotted, every opportunity possible should be used to supplement that information in the curriculum in other courses where it can be suitably related. In this way additional emphasis may be given to eye problems. The method has value also for the student in his learning process to think of eye health as part of the total health of an individual, rather than seeing it as something highly specialized and complicated about which he can do little. Wherever possible the medical lectures by an ophthalmologist in schools of social work should be supplemented with social case work material presented by a medical social worker familiar with eye social work, who can correlate the medical information with the social to give the subject reality for the student. Acquisition of scientific medical data is important in itself but its usefulness in social work can be greatly increased if its application can be shown in terms of the student's ability to use it in her daily practice. The case work courses in schools of social work also provide an opening for the instructor to include discussions of case material dealing with eye problems which again can bring to the attention of the student, indirectly, the importance of medical and social treatment in relation to vision.

In the training of the medical social worker, of course, greater emphasis is given to all phases of medical care than to students preparing for other fields of social work practice. However, the medical social workers also obtain their basic information on ophthalmology in the first year of training, and the amount of attention given to it in the second year depends upon the individual school of social work. The school may be influenced in the amount of time given to eye problems by various factors, such as the health problems which seem to need greatest attention in its particular community, the ability to secure ophthalmologists and medical social workers with experience in eye care for teaching, and whether or not the community has developed programs and case material which can suitably be used for teaching purposes. In a number of schools the medical social work students in their second year have a series of projects on important medical problems. In schools where community resources can provide it, courses on the medical social aspects of eye diseases have been held at eye hospitals or in eye clinics, for four or five days. In these projects, the

students have had lectures by ophthalmologists on eye anatomy, diseases of the eye, causes of blindness, and the significance of treatment of systemic conditions in relation to conservation of vision. The lectures have been followed by presentations of illustrative case material by medical social workers, for discussion. In addition, selected reading lists on eye care and programs of prevention of blindness have been made available during the project. The students are permitted to see an eye clinic in operation and to talk with the examining ophthalmologist about eye diseases as they are seen in clinic. The fact that the projects are conducted in the physical setting of the hospital and that the students are able to see on an average of 150 patients per morning having eye examinations, makes them realize the great need for eye care in the general population. Seeing the doctor and social worker in the clinic and the type of referral made to the social worker brings out the significance of the problems and indicates the necessity of skilled case work technique in handling serious individual situations. Some of the projects have included lectures by workers from state agencies for the blind who have presented statistics on the blind, outlined services to the blind, and interpreted the state's program for prevention of blindness. Including statistics related to blindness caused by b.b. guns, fireworks, and industrial accidents, gives the students, in a forceful way, a recognition of the need for legislation in various fields if unnecessary blindness is to be averted. In addition to the projects, some of the schools of social work are using case material from eye clinics for seminars in case work and psychiatry. The emotional problems referred to the social worker in an eye clinic make excellent teaching material.

The special training course for social workers planning to work in eye clinics or prevention of blindness programs which has been offered until recently at Washington University is of particular value because of its attention to the many aspects of eye care—medical, social, psychological and community planning. It is not designed, nor would it be practical, for all medical social workers to have this course. However, there is probably much known from the experience gained there which would be helpful to other schools in the training of medical social students in this field.

Since the schools of social work are enrolling a number of students from South America, Puerto Rico, and other countries, for training in medical social work, some provision for these students to have a field work placement in an eye clinic for at least part of their training is a practical way to stimulate their interest in prevention of blindness in their own countries.

For the social worker who has not had full, formal social work training but who may be learning on the job through an in-service training program in the field of public welfare or others, several methods may be used to create an awareness of the importance of sight conservation. This can be done repeatedly by the conference method—both in individual conferences and in group conferences—on case work treatment, if the supervisor herself is informed on the medical problems relating to eyes. The Old Age Assistance worker is in a key position to help many elderly people maintain useful vision if she understands the need for glaucoma patients to have regular medical supervision, and if she has some knowledge of what surgery ofiers to the client with a cataract and can give him the necessary encouragement and support to have the prescribed treatment. Courses in medical information given in the "orientation period" for workers in training and for full staff workers can be planned to include information on eyes. Some hospitals have offered such courses for workers in public health and welfare agencies. One state agency for the blind has endeavored, through its department of prevention of blindness, to stimulate interest in prevention and in conservation of vision by giving specific courses on eye care, including structure and anatomy of the eye, its function, common eye conditions, relationship of the eye to the body, lighting as it affects vision, eye hazards, etc. The length of a course of this type may vary according to the wishes of the agency requesting the course; in some cases extending for one- or two-hour lectures for a period of six weeks or in other cases a concentrated course in one day. An estimated 1,280 students in various agencies, schools of nursing and of education have been reached by a similar method during the past year by a single agency of prevention. This shows how much can be done if an agency has the facilities to offer the material and the conviction of the importance of such instruction.

These methods, for in-service training workers, can be supplemented by encouraging the attendance of such workers at state conferences of social work programs or other conferences where those interested in prevention of blindness should see that this subject is included in the program. Bulletins which are appearing in prevention of blindness departments in some of the state and private agencies are a means of keeping the subject before the attention of social workers. In one state the department of health has a news bulletin which is circulated to both social workers and doctors, and the prevention of blindness worker in that state makes a point of seeing that each issue contains one article on some aspect of eye health or prevention of blindness. One eye clinic which uses interpretive pamphlets with glaucoma patients is using the same pamphlet with social workers in public welfare departments, family agencies, and with visiting nurses who have glaucoma patients under treatment, as part of its interpretation of the need for prolonged medical supervision. These could be used more widely but the thought has been to send the material to the social worker when her patient is under treatment so that it will have meaning in relation to her particular client.

A great deal of interest was recently shown at a combined meeting of social workers and lay people where an ophthalmologist discussed the increasing number of young people becoming blind from diabetic retinitis. There are constantly recurring chances for eye workers to make suggestions for programs in health and welfare agency meetings which will keep the subject of eyes in mind. Pamphlets giving brief and clear information about eye abnormalities and the effect of contagious diseases and infections on the eyes of children should flow regularly to the staff of child welfare agencies. In these agencies and in nursery schools there is opportunity for early recognition of retinoblastoma where treatment is important primarily as a life-saving measure.

There is not time in this paper to discuss the methods of instructing public health nurses and teachers in eye care but everyone is aware of the importance which both of these groups play in health education, and many of the methods used in the training of social workers are applicable to these fields also. The National Organization for Public Health Nursing reports that the *Public Health*

Nursing Curriculum Guide in various places "touches on vision testing of school and preschool children but there is almost nothing about eye conditions." The National League for Nursing Education Curriculum (published in 1937) suggests 8–10 hours' basic training for student nurses in eye and ear conditions. This curriculum is suggestive only as is that of the American Association of Medical Social Workers. However, there are state laws which affect the nursing school curriculum, and in Massachusetts, for example, seven classroom hours are required for ophthalmology and ophthalmological nursing. All student nurses undoubtedly receive some ophthalmological instruction, but definite emphasis on the care of eyes in the public health nursing field would seem to be of major importance since these nurses may be in touch with many more potential eye patients than the average social worker.

The problem of creating interest in prevention of blindness among social workers whose main focus is not on eye conditions seems to be one of how to stimulate that interest. Some suggestions have been made here in regard to the methods of education now in general use. There is need, however, to consider whether these methods are satisfactory. Should social workers and others interested in prevention of blindness be satisfied until specific ophthalmological training is either required or included in the training for all social workers, public health nurses and teachers? Until it is included in all training programs, it cannot be expected that information on eyes will assume the importance of some other medical problems. There are few physical handicaps which bring the dependency and frustration of blindness, yet emphasis on prevention of blindness and conservation of vision in all public health and welfare education is meager in comparison with its importance. Those who train medical social students in eye clinics know how little these students know about eyes even when they have had the ophthalmological lectures provided in the curriculum.

The workers in programs for prevention of blindness and in eye clinics could no doubt do more than in the past to bring about more widespread and effective eye education. The channels already established in schools of social work and nursing could be used more extensively and to greater purpose. But to broaden and deepen those channels takes initiative on the part of trained eye

workers who daily see the need for this knowledge in allied professional groups.

Education is a never-ending process which requires constant attention and vigorous efforts for improvement. The methods of instruction for prevention of blindness will always vary according to individual situations, but correlation of the medical and social factors in ophthalmology is essential if the information is to have lasting value to any student and is to become one of the professional tools with which she serves the whole individual.

Effective Methods in the Development of a Prevention of Blindness Program*

C. Edith Kerby

URGES the need for training in eye work of teachers, nurses, social workers, vocational counselors, etc.; in-service training for those already on the job; and the need for keeping up to date on new discoveries and improved methods.

EVERY time I see or hear a listing of the variety of hazards to which the eye may be subjected throughout life, I am reminded of the reactions of two persons who had been shocked by the threat of blindness to a mutual friend. One had a sense of personal guilt in the situation. She said, "Oh, why didn't I know that was likely to happen?" The other asked, "Why can't we do something to prevent such things from happening?"

In those two key words, *know* and *do*, we have the basis for the two main features of the program for prevention of blindness—the educational and the service programs. The clues that will indicate specifically what our state or community agencies should know and do come also from the listing of eye diseases and defects.

One type of listing frequently employed is to point out the most prevalent and the most serious eye conditions occurring in each age group. Thus it becomes possible to select the items which should be of special interest to those in charge of maternal and child health or child welfare services and those of particular concern to agencies having adult clients. The former, who have made notable progress in prevention of blindness due to ophthalmia neonatorum, will want to know how they can help prevent German measles in the pregnant woman or premature birth of her baby, either of which may cause congenital eye defects.

* Presented at the 1946 National Conference of Social Work, Buffalo, N. Y.

Another approach is to lay emphasis on the causes of various eye affections. Analysis of these causes gives a different type of clue because, if we know the cause, our objective becomes elimination of the cause (e.g., safety measures to prevent eye accidents in play and in industry; communicable disease control for infections that affect the eyes).

Still another aspect that may be stressed is the paramount importance of early diagnosis and adequate treatment (for glaucoma and strabismus, to mention only two). This, of course, suggests the need for case-finding procedures and treatment facilities.

Finally, a description of the nature of each type of defect provides us with a basis for understanding the needs of the person with a specific visual handicap, so that we may know how best to guide him to corrective treatment, if that is possible, or if not, how we may use our detailed knowledge of the nature of his visual handicap to aid him in the selection of a job in which that visual handicap is immaterial.

Taken together these four points suggest the basic approach to the solution of the problem of preventing blindness. We must recognize that there are many problems (not just one) and for this reason many persons and agencies must cooperate in their solution. It is absolutely essential that everyone who holds any position involving protection of the health, welfare, or safety of others (and, as far as possible, the general public as well) should have knowledge of eye diseases and defects, their causes and methods of treatment and prevention. And it is equally essential that that knowledge be translated into a plan of action. Thus, disseminating information and stimulating development of facilities are the main functions of the prevention of blindness worker.

In any state or community which has recognized the need for conserving vision and has determined to do something about it there is usually one agency which assumes the position of leadership. This may be a subdivision of an official department such as the welfare department, or a voluntary prevention of blindness society sponsored and supported by interested individuals. The staff of such an agency may be (and usually is) quite small in number, which means, of course, that its members cannot begin to undertake directly the many tasks involved. However, it is neither

desirable nor necessary that they do so. We all recognize that education, health, social service, vocational guidance, etc., are functions which can be performed best by those who have had special training as teachers, public health nurses, social workers, vocational counselors, respectively, within the departments or agencies having primary responsibility for those functions. Or, when a project involves two or more functions, the appropriate workers and agencies may cooperate.

The first step to be taken by a prevention of blindness worker in planning any project, then, is to look the situation over very carefully and decide which professional group in which agency could logically undertake the necessary tasks as part of its own program and to work toward ultimately influencing that agency to accept full responsibility and do the job. Although that goal may not be reached soon, it should never be lost from sight, because in the right place a function attains a permanent place. Moreover, it has an infinitely better chance of being repeated in similar situations wherever and whenever needed. Thus the prevention of blindness worker greatly multiplies her effectiveness and at the same time leaves herself free to proceed with organization of the next prevention project. Let me give an example, so that you may judge for yourself what is the constructive approach. A local prevention of blindness agency decided that vision testing of school children was necessary to find those in need of eye care or special education. Prevention of blindness workers spent the greater portion of their time going from school to school testing every child, but had not finished all schools when, after a period of a few years, it was decided that the agency should turn its attention to other matters. Then it became necessary to choose between dropping the service, with no assurance that the schools would or could carry it on, or to assist the schools to give the teachers some basic eye knowledge and training in the techniques of vision testing. Naturally the latter course was decided upon—about three or four years late.

Please do not get the idea from what I have said so far that all the prevention worker has to do is to present the director of some agency with a general request that he do something. Far from it! The prevention worker does much of the preliminary planning and organizing and may even participate actively by demonstrating

just what is to be done and how to do it. The important point to remember is that, since control will ultimately lie within the other agency, the director of that agency (or the member of his staff to whom he delegates the responsibility) must participate in the planning from the beginning. In every possible way he must be made to believe in the value of the project and to want to do everything within his power to make it successful. Incidentally, if you want "to make friends and influence people" in the prevention program, you must not worry too much about plagiarism of your ideas. If someone accepts a suggestion so wholeheartedly that he acknowledges it as his own, so much the better, because it gives an almost certain guarantee that he will carry it out.

It may be necessary at times also to accept less than the ideal at first and build gradually toward that ideal, in order to make the project fit the particular situation. It is always best to compromise on the less essential points, to build up a reputation for being practical and cooperative. This will probably have the desired effect of maintaining your position as chief consultant of the agency in relation to this project plus a chance to develop other prevention of blindness activities within that agency.

At this point I want to call your attention to a practice that seems to be rather common in prevention of blindness agencies. It is this: when an announcement is made, in the SIGHT-SAVING REVIEW or *Eye Health and Safety News* or elsewhere, of an interesting project carried by one of the prevention agencies, several others seek detailed information on the plans and procedures, and endeavor to set up an identical project in their own areas. This sharing of ideas has both advantages and disadvantages. If the project is a good one and is really needed in the second community, well and good. But it may not be desirable or practical, at least without modification, in other communities. An example of this is the practice of copying verbatim the laws of another state, which can be carried to such absurd lengths as duplicating or contradicting existing laws, or failing to make practical provisions for enforcement. Incidentally, it appears that it is this questionable practice, rather than any attempt to follow an ideal standard, which has resulted in the placement of prevention of blindness as a subdivision within the state agencies serving the blind. One effect of

this placement tends to be that the program of the prevention unit is subordinated and limited—subordinated, because it can command only a fraction of the attention of the agency's executive, and limited to types of activity which gear into the service program for the blind. Too often the program is confined to corrective eye care, and that only for those who are so severely handicapped visually that they just miss falling within the definition of blindness. Actually, it is just not true that prevention activities require closer coordination with work for the blind than with other state functions, such as health, education, etc.

As we have seen, the two main activities in the prevention of blindness field are the educational program and the service program. Under the first, we broadcast as widely as possible what must be done to conserve vision and prevent blindness; under the second, we stimulate organization of facilities to bring adequate eye care, eye safety and efficient environment within the reach of all. Obviously it is important to keep these two features of the program in balance. We waste the time spent in trying to teach the public to seek services which are available nowhere within the state, not to mention the frustration induced in those who try to follow our advice. A case in point is the futility of advocating orthoptic training in the treatment for strabismus before there is a single trained technician or training center in the area, or even an appreciation of its possibilities among ophthalmologists who would be responsible for establishing and supervising such a service. Or, consider the problem of visual screening of school and preschool children. The stimulation and training of teachers and nurses to do this must proceed little faster than development of community facilities for eye care.

Regarding the specific functions which the prevention of blindness worker should be prepared to perform in relation to any project, they fall into the following categories:

1. Assembling facts and arguments to show the extent of a problem or the need for a service.
2. Assembling basic information on the legislation, personnel, facilities and methods needed for adequate performance of a service.
3. Assisting in planning detailed procedures and in procuring necessary equipment.

4. Assisting in the selection of qualified personnel for the project and/or in their special training if such is required.
5. Assisting in the selection of qualified specialists to give consultant or advisory service.
6. Assisting in the development of record forms to facilitate smooth operation of the service and to prove the value of the service.

It is clear from this listing that the prevention of blindness worker is necessarily the primary source of information and materials—information about the needs of the community, as well as about the means to be employed in meeting those needs. She accomplishes her purposes by disseminating that information in the places in which it is most needed and will do the most good. She performs her most effective service when she makes prevention workers of all with whom she comes in contact. Which brings me to another and final precept to be followed by the prevention of blindness worker. It is the process of training disciples. If we really expect each professional group and agency to be wholehearted cooperators, it is encumbent upon us to help them to become well prepared for the job. We can do this by seeing to it that: (1) adequate eye knowledge is incorporated into the basic training of teachers, nurses, social workers, vocational counselors (and even physicians); (2) those already on the job have opportunities for appropriate in-service training; and (3) that we keep them up to date and continuously alert by passing on information about new discoveries and improved methods as they become available.

The best prevention of blindness program is one in which there are many participants.

The Case Work Aspects of Medical Eye Care*

Charlotte-Ann Breed

CALLS attention to the necessity for the eye worker to consider her ability to face her own problems as a social worker before she undertakes to assist the patient in adjusting to his eye problem.

BECAUSE the eye carries with it such responsibility in our lives, it has a very close effect upon our psychological makeup. It affects everything we do—our relationships to other people, our jobs, all parts of our lives. It is therefore important that the worker who is going into this area know how she herself feels about her own eyes and about blindness, about the threat of blindness, about eye treatment itself. A worker who would react with such trauma to necessary eye surgery for herself that she needed help would be, obviously, a poor person to establish a relationship with patients who have to meet these problems.

We know that one of the basic factors in case work service is the establishing of a close relationship, and that presupposes an identification with the patient's problem and with the patient himself. But when that identification goes so far that it becomes the worker's problem, she is no longer able to help the patient. Therefore, she must work through her own feelings before she is really prepared to work with eye patients. Her feelings may be in reference to other things than medical eye care or blindness. For instance, it may be necessary for her to repeat her medical interpretation to the patient many times. She may have difficulty in accepting the patient's own right to decide whether he is going to go blind or have eye treatment. What we used to call his lack of cooperation—which we now call resistance—may affect her in a way that would render her incapable of helping. She needs to

* Presented at the 1946 National Conference of Social Work, Buffalo, N. Y.

know how she reacts to fear, so that she can see the patient's fears—recognize them and diagnose them correctly.

I should like to say something further about this first step in any case work process. So often we find that, although eye care is apparently the thing that is presenting the problem, the patient will bring in something entirely different. I am thinking about a particular case where an elderly man was referred for eye surgery—cataract surgery—and told the worker that his wife had refused to let him have it. He said further that his wife had threatened him with a divorce, after fifty years of stable marriage, if he insisted upon having cataract surgery. After the worker discovered that the wife had lost their only child in a hospital—that that had been their only contact with a hospital and that her resistance to the prescribed treatment for her husband was out of fear of losing him—only then was the worker able to help the patient secure the medical care that was necessary. The other problem, while seemingly removed from the eye problem, had to be worked through first.

It is helpful to reach patients as early as possible—if possible before they have had their first contact with the ophthalmologist and have had the diagnosis given them. In this way some of the fears may be relieved that are attendant to what the doctor is going to tell them. Is he going to say: "You are going blind," or "You are going to have your eyes operated on," or "Your child is going to have to wear glasses at the tender age of four, or less"?

One little girl gave us an excellent example of the need for giving people the opportunity to talk with someone before they have seen the doctor. Her mother was talking to the worker at the time, and the youngster was out in the outer office playing with the toys. The receptionist noticed that she was crying quite bitterly. She called the youngster over and asked her if she was afraid, and the child said that she was. The receptionist said: "Well, let me tell you what happens in the doctor's office." She proceeded to give her a very thorough description of what the examination would include. Not until after she had done that did she say to the child: "Now, you tell me what you were frightened about." The youngster said that the other children in school had known that she was going to have an examination and told her that when you had an eye examina-

tion the doctor took your eyes out and looked at them. Fantasy far away from reality, but what a terribly frightening thing for a youngster to have to meet. We know that had that youngster not been relieved of fear, she would never have cooperated with the doctor. He never would have gotten drops in those eyes, and he would have had a very unpleasant situation on his hands in his office.

When the diagnosis has been made, the worker needs immediately to be in touch with the doctor—preferably a personal interview—so that she can have opportunity to understand thoroughly the diagnosis, the treatment, and the background of the case. Until she has that, she has no right to start her interpretation to the family, or to the patient. How many times patients say: "Oh, I wanted to ask the doctor this question and I forgot," or, "He was so busy and I hated to take any more of his time." To give patients an opportunity to relax and ask questions is many times the best method of interpreting their diagnosis to them. It is difficult to know what people don't know, and if one begins by giving information, even though simply, one may still fail to answer the questions that are at the root of the patient's anxiety.

This is the point at which repetition is so frequently necessary. In so many eye conditions, the doctor has recommended not anything to do with the eyes, but treatment for systemic conditions such as syphilis or diabetes, and to a patient it is almost impossible to understand why the doctor is not putting glasses on, not using drops or ointment, or something directly connected with the eyes. He comes back again and again, saying: "Yes, but it's my eyes that are bothering me. Can't you tell the doctor that it's my eyes? Yes, I know I have diabetes, but that isn't what is bothering me. I am not having pain from that. I am going blind." Over and over again, the worker must repeat the fact that in order to treat the eyes the body must be treated. Sometimes this necessity to repeat is rather trying to the worker. Again it is important to point out that the worker must face the prospect of tedium due to necessary repetition, before it arises in a relationship with the patient.

Another problem is the preparation of patients for surgery—first, children. It seems to me that we all tend to ignore the young patient and his difficulties, anxieties, and fears, and put our em-

phasis on seeing that mother and father know of what the operation consists. It is amazing what young children will ask. It is amazing how they relax as you answer their questions. They ask you some of the most practical things. "How am I going to stay in bed all the time?" "How do I go to the bathroom when I have to stay in bed?" "What is the doctor going to do with me—is it going to hurt?" All the questions show an effort on their part to come to grips with the situation with which they are faced. To know where the bell is; to know that everything is white in a hospital; to know that there is going to be a nurse who will come just as soon as she possibly can, but she may not come the moment she is called; to know how anesthetic is given—all place the child in a position of going into a situation that is not entirely foreign to him and, as a result, he can be a much better patient.

The adult needs very much the same type of explanation, and the same opportunity to ask questions. When it is such an important thing as cataract surgery, for instance, in which the patient may himself ruin the effect of good surgery, the patient's state of mind and the knowledge of his responsibility may well mean the difference between vision or blindness.

The doubtful prognosis in which the patient may maintain a certain degree of vision, but may fear losing even that, is another one in which the support of the case worker is very essential. To know how to use limited vision; to get the best use out of it; to know some of the tools which make living easier with limited vision; to look forward to a future of possible blindness; to accept the fact that there is nothing the doctors can do to give one more vision, but by cooperation and working with him on the treatment prescribed, one may at least maintain the vision that is left; to relinquish the urge to seek other medical authorities—these are all the steps that a patient must go through before he can accept his own situation.

Rehabilitation of the Partially Seeing

Virginia M. Smith

RECOMMENDS careful evaluation of visual functions in relation to proper placement of the partially seeing. Indicates the need for using guidance of specialists in developing a well-rounded rehabilitation program.

THE National Society for the Prevention of Blindness, as a national public health organization primarily concerned with the development of adequate eye health services, has given consideration to the rehabilitation problems of the partially seeing. Since attention must be focused on the value of their remaining eyesight, the requirements of this group of rehabilitation clients are entirely different from those of the blind.

Eyesight cannot be evaluated by the use of a single test, as the process of seeing is not a single function, but a composite of several. For this reason it is essential to consider the outstanding visual functions in which defects may occur which may create an employment handicap. Chief among these are:

Central visual acuity of each eye.—Ability to recognize the form of objects in the direct line of vision—tested for distance, near vision and work distance. (The individual is classified according to visual acuity obtained after correction with glasses, if they improve vision.)

Binocular vision.—Ability to use the two eyes simultaneously to focus on the same object, and to fuse the two images into a single image which gives a correct interpretation of its solidity and its position in space (also referred to as depth perception).

Muscle action.—Ability to turn the eyeballs in all directions and to maintain balanced action of the two eyes so that the images fall on corresponding points of the two retinas.

Peripheral Vision.—Ability to distinguish or perceive presence, motion, or color of objects in the area surrounding the direct line of vision.

Color Vision.—Ability to discriminate the primary colors: red, green, blue.

Evaluation of an individual's visual functions is not the only factor to be considered in selecting the proper job. It is also necessary to analyze very carefully the visual requirements of the job. In addition, individuals vary greatly in their ability to adjust themselves to their handicaps and to adapt themselves to specific jobs. For these reasons it is not possible to prepare a list of occupations which are generally suitable for the partially seeing.

However, it is fairly simple to judge by inspection whether a certain type of visual ability is essential in a given occupation. For example, one would not select for a one-eyed person a job requiring ability to judge distance and position of objects, since his function of depth perception has been destroyed. Nor would one recommend a job involving discrimination of colors, such as in traffic signals, to a color-blind person. Any contractions or blind spots in the field of vision constitute a serious hazard in occupations such as operating motor vehicles, in which awareness of objects approaching from the side is essential.

In considering a placement, a thorough review of the job should include a careful check on the working conditions which are directly related to eye comfort, efficiency and safety. The following general principles apply to all jobs:

Light should be adequate in amount, well distributed, free from glare, and directed so that it will not shine into the eyes.

Plant housekeeping pertains to proper decoration and care of equipment and surrounding surfaces to relieve monotony and prevent eye fatigue, or to accentuate areas or objects.

Arrangement of work should be such that long periods of close visual work, motion and eye span are relieved to prevent ocular fatigue.

Safety provisions should include those protective devices needed to safeguard the eyes of the workman and of his fellow employees. This provision is especially important when placing a partially

seeing individual in a job, in order to avoid the possibility of his creating an accident hazard.

In considering the evaluation of the various visual functions, it is not sufficient to think only in terms of the degree of the handicap. It is also necessary to determine the nature of the handicap. For instance, if a pathological eye condition is present which may not have affected the individual's vision to any great extent at the time of his application for rehabilitation, but which may be seriously aggravated by certain activities or surroundings, the proper placement must be based on what the individual should be permitted to do, not on what he can do. For example, if the diagnosis is high myopia, an occupation which involves heavy lifting is unsafe because these activities may cause a more serious condition—detached retina. Selection of jobs in which great pressure and emotional strain are involved must be avoided for persons with glaucoma. Individuals with aniridia and albinism cannot tolerate excessive light, while those with retinitis pigmentosa cannot function under low illumination.

Another serious problem to be taken into consideration is that related to progressive eye diseases, in which the follow-up program is of primary importance. In some of these cases it is necessary to anticipate having two rehabilitation plans—one to be followed as long as the person retains a certain amount of vision, with a different one after the loss is very marked. However, it is most unwise to recommend that the individual learn to read Braille, for example, or to provide training in weaving, until the loss of sight requires such measures. Such recommendations have been known to cause emotional disturbances having an adverse effect upon the success of the individual's rehabilitation.

In view of the above-mentioned factors, it will be recognized that ophthalmological guidance and a thorough understanding of eye conditions are essential if the partially seeing are to receive the full benefits provided through rehabilitation services. When the ophthalmologist prepares reports on eye examinations these should include specific recommendations as to what the individual may safely do, in view of the medical information. Of course, it may be that the ophthalmologist is not familiar with details of jobs, nor informed about all processes of rehabilitation; in such case, he will

require the guidance of rehabilitation counselors as to just what information they will need from him in determining what jobs the individual may undertake.

There are certain bits of information in the medical eye reports which are extremely significant to the medical social worker and the public health nurse. For this reason the client should have the benefit of services from these professional consultants. In many instances, of course, it is not possible to have on hand a consultant, other than the ophthalmologist, who is trained to interpret the information on the eye record. Certainly the ophthalmologist does not have the time nor is he responsible for explaining each individual case to the rehabilitation worker. Therefore, it is advisable to investigate various groups and agencies on the state level which might be able to offer some consultant service in this direction. For example, supervisors and teachers of classes for partially seeing school children are well prepared to understand the visual problems encountered. State prevention of blindness workers functioning in 24 states are in a position to serve as advisers to rehabilitation personnel since their training in the eye field has prepared them to understand the medical, social, and psychological adjustment problems of the partially seeing. Their assistance in planning instruction for members of a state rehabilitation staff during a regular in-service training program is one type of cooperation which might be secured from this group.

In addition to the program organized for specific groups of handicapped individuals, as described by the Federal Office of Vocational Rehabilitation, the National Society for the Prevention of Blindness calls attention to the importance of providing adequate tests of various visual functions as a part of the general medical examination required for all rehabilitation applicants served either by state or private agencies. As a national public health organization, the Society does not engage in case work but devotes part of its program to the preparation of educational materials which may be useful in guiding agencies serving individuals. Specific material which may be helpful to rehabilitation workers covers the following:

1. Information about eye diseases and defects which constitute a visual handicap and thus a vocational handicap, possibilities for

corrective treatment and methods of providing case work and ophthalmological services.

2. Interpretation of visual functions, methods of testing these functions and their significance in relation to specific vocations.

3. Coordination of rehabilitation services with existing services in the fields of prevention of blindness and restoration of vision.

The Society is carrying on an extensive program related to the protection and utilization of eyesight in industry. Through this program, industry is urged to adopt adequate eye protection measures and to consider placement of the individual on the basis of results of preemployment and periodic eye examinations. As a result of this effort, it is anticipated that simple, practical methods of testing visual functions will be developed which may assist rehabilitation workers in determining visual abilities.

The Society has established relationships with professional groups such as physicians, nurses, social workers and educators, as well as with agencies contributing to conservation of vision, and is in a position to aid in fostering cooperative relationships which will further the development of rehabilitation programs.

Educational materials are available upon request, as well as field service which might be useful in bringing together some of the specialists available at the state level.

Causes of Uniocular and Binocular Blindness in the U. S. Navy and U. S. Marine Corps in World War II*

Capt. C. A. Swanson, (MC) U.S.N.

and

Lt. R. A. Stewart, (MC) U.S.N.R.

AUTHORS cite the differences between eye damage in World War II and World War I, and explain the reasons for the differences.

WORLD WAR II has been noted for the superb medical and surgical care of the injured fighting man. Eye injuries provide an interesting aspect of military medicine, although they comprise only a small percentage of the total injuries.

The eye injuries during the American Revolution of 1776 and the War of 1812 reveal nothing more serious than burns of the eyelids and eye from flashings of powder from old-fashioned flintlock muskets or from bits of flint itself. During the Civil War, the frequent occurrence of sympathetic ophthalmia was noted.

World War I was accompanied not only by severe eye injuries due to gunfire, but also by ocular injuries due to poisonous gases. It is noteworthy that in World War I there was not one case of sympathetic ophthalmia.[1]

War medicine during World War II was characterized by better care of eye injuries, not so much because of improved surgical techniques, but rather because of chemotherapeutics. The sulfa drugs and penicillin used soon after eye injuries have undoubtedly decreased the severity of eye complications.

* Appearing also in *Naval Medical Bulletin*, April, 1946.

Generally speaking, eye surgery in the military sphere differs from that in civilian life in that an eye wound is usually virulently affected with the infection probably some days advanced before surgical interference is possible. The tissues are also far more severely traumatized than are those seen in industrial accidents.

The surgeon has been taught to follow a plan of early and extensive debridement of gunshot wounds. However, such a course should not be followed in wounds of the eyelids in which primary suture is indicated. Infection following primary suture is extremely rare and when it does occur it can be easily controlled. Plastic work upon the eyelids varies from civil routine, in that one encounters marked defects of the orbital margins and bony structures of the face.

Types of Eye Conditions Requiring Medical Care During War

Many of the other ophthalmological problems such as iritis, corneal ulcers, and refractive errors often cause more loss of manpower in combat than do the gunshot wounds of the eye. During a one-year period, ten times as many patients in one U. S. Naval Base Hospital were incapacitated and evacuated for refraction and disease of the eye as were evacuated because of eye injury.[2] The intra-ocular muscles can overcome a moderate hyperopia under normal conditions, but when hyperopes are subjected to severe battle conditions, with loss of sleep and severe physical and psychic exertions, eye symptoms develop easily.

Frequently, in war wounds the eye injuries may be minor compared to wounds elsewhere, and the major wounds must be cared for first. Injuries to the eyes must not be overlooked after the other major injuries are under control. There must be a close liaison between the ophthalmologist and the general surgeon. The eyeball sometimes appears literally to "explode" in the orbit. Often the orbital injuries from secondary bony missiles do more damage to the eyeball than the bullet does. Bullets entering the eye, anteriorly, are rare.

Shrapnel wounds around the eye often show incompletely burned powder incrusted in the face and eyelids; grains of sand, gravel, mud, and metal can give the extra-ocular region, cornea, and conjunctiva a tattooed appearance. These wounds must be

irrigated with boric acid, the skin cleansed with soap and water, and each grain of embedded material must be painstakingly removed without causing too much reaction. Penicillin and sulfadiazine have greatly decreased the secondary infection resulting from these wounds.

Bomb explosions may produce such a marked air compression that retrobulbar hemorrhage with proptosis, total loss of vision, and subsequent optic atrophy develop. Iridodialysis and rupture of the choroid with secondary glaucoma may occur.

Thermal burns have been frequent in this war although most of the cases have not resulted in unilateral or bilateral blindness. The eyelids, principally, have been involved. It is sometimes necessary to suture the eyelids together as a help in the general treatment.

An excellent description of eye casualties and diseases in combat was written by Benkwith.[3] In some of his eye injuries, he irrigated the anterior chamber with a freshly prepared solution of calcium penicillin, 10,000 units per cubic centimeter. Subconjunctival injections, amounting to 2 cc, were made over the globe, using the above dilution of the commercial preparation of calcium penicillin.

Blindness as a Result of War Injuries

In the statistics which follow, we have defined blindness as a visual acuity of 20/200 or less, not correctable by any type of lens, or a permanent visual field of 15 degrees or less in its widest diameter. Seven hundred and fifty-nine cases were studied.

Bilateral Blindness

During the World War II years, up to and including the calendar year of 1944, there have been 119 cases of bilateral blindness in the U. S. Navy and the U. S. Marine Corps.

The causes of binocular blindness may be subdivided into the following categories:

Trauma due to enemy action	72
Non-combat trauma (explosions, etc., not in combat zone)	12

Blindness due to medical causes	35
Chronic iritis	1
Uveitis	2
Chorioretinitis	2
Retrobulbar neuritis	1
Optic neuritis	1
Optic atrophy (etiology unknown)	8
Methyl alcohol	19
Optic atrophy secondary to brain tumor	1

In the case of war wounds causing bilateral blindness, some of the injuries are almost freakish. One marine was blinded by a bullet wound going through the left temple removing both eyes and the bridge of the nose.

We were astounded by the number of men made blind by methyl alcohol. It would seem that methyl alcohol could be designated by some name which has no phonetic resemblance to ethyl alcohol. Also perhaps something could be done to camouflage the characteristic ethyl alcohol-like odor.

Unilateral Blindness

There were 640 cases of unilateral loss of vision in the U. S. Navy and U. S. Marine Corps. The causes of unilateral blindness may be subdivided into the following categories:

Trauma as a result of enemy action	322
Trauma as a result of non-combat action	143

One hundred and twenty-six were blinded because of medical reasons. These are classified as follows:

Cornea: 13 eyes blinded	
Burns of the cornea	2 (2 enucleated)
Corneal opacity	10
Malignant pterygium*	1
Sclera: 1 blinded	
Malignant scleral nevus	1 (enucleated)

* Four operations were done to relieve this condition, but a permanent opacity remained over the pupillary area of the cornea.

Iris: 5 blinded
- Iridocyclitis . . . . . 5 (4 enucleated)

Lens: 13 blinded
- Traumatic cataract . . . . . 12 (2 enucleated)
- Senile cataract 1

Choroid: 19 blinded
- Choroiditis 12
- Malignant melanoma . . . . . 6 (all enucleated)
- Posterior staphyloma 1

Retina: 18 blinded
- Amblyopia ex anopsia 2
- Detachment of retina 5
- Hole in macula 4
- Hypertensive retinopathy 1
- Thrombosis central retinal artery . . 4
- Retinitis proliferans 1
- Retinitis pigmentosa 1

Optic Nerve: 20 blinded
- Coloboma of optic nerve 1
- Primary optic atrophy 4
- Secondary optic atrophy 15
  - 4 (skull fracture)
  - 4 (trauma)
  - 2 (meningitis)
  - 1 (measles)
  - 2 (optic neuritis)
  - 1 (pansinusitis)
  - 1 (retrobulbar neuritis)

General: 59 blinded
- Endophthalmitis . . . . . 2 (2 enucleated)
- Primary glaucoma . . . . . 3 (2 enucleated)
- Secondary glaucoma . . . . . 4 (3 enucleated)
- Panophthalmitis . . . . . 21 (21 enucleated)
- Uveitis . . . . . 3 (1 enucleated)

In a study of 901 non-fatal cases of heavier-than-air Naval aircraft accidents it was found that 40 cases had minor injuries to one eye

and 15 cases had minor injuries to both eyes. Four cases had major injuries to one eye and one case had major injuries to both eyes.

The 640 cases of uniocular blindness is unquestionably an understatement. For example there may be cases of primary atrophy due to syphilis in which the eye diagnosis is not mentioned, but the case itself may be listed under the diagnosis of *dementia paralytica*. There are many cases of diseases or injuries in which the vision was probably below 20/200, but the visual acuity was not recorded.

Intra-ocular Foreign Bodies

A particularly important subject in military ophthalmology is intra-ocular foreign bodies. About 66 per cent of the intra-ocular foreign bodies were classified as magnetic and 33 per cent as non-magnetic. About 50 per cent of all intra-ocular foreign bodies eventuated in enucleation. One non-magnetic intra-ocular foreign body in the vitreous near the macula was removed by forceps under ophthalmoscopic observation.

The injury from war wounds is frequently so extensive that the eye cannot be saved even though the intra-ocular foreign body is removed. Since the equipment necessary for the removal of an intra-ocular foreign body is large and cumbersome, it is necessary to resort to evacuation to a base hospital, and valuable time is lost. However, intra-ocular foreign bodies have been removed successfully with the diagnostic aids of a portable x-ray machine and a sutured silver wire around the limbus as a locator.

Frequently, the patient receives such multiple wounds that the eye treatment must be postponed until shock and extensive bodily lacerations are treated.

History of Eye Injury Essential.—The history of the type of eye injury sustained by the patient is most important. Any evidence of a perforating injury to the eyeball should make one suspect an intra-ocular foreign body. A small conjunctival laceration with a subconjunctival hemorrhage may be the point of entrance of an intra-ocular foreign body. A bloody vitreous may make one forget the possibility of an intra-ocular foreign body. A careful examination under good illumination with the loupe, slit-lamp, and ophthalmoscope is the first step in the examination. The Friedenwald slit-lamp ophthalmoscope offers a valuable aid in penetrating

cloudy vitreous. The point of entrance of an intra-ocular foreign body offers no definite clue as to its location. The ocular tension must be taken if there is any question of hypotomy. The trans-illuminator can frequently demonstrate holes in the iris.

X-ray for Locating Intra-Ocular Body.—X-ray offers the best diagnosis for the presence and localization of an intra-ocular foreign body. A film taken in one or two positions may not rule out an intra-ocular foreign body. One must often resort to Vogt's "skeleton free or bone free" method for those foreign bodies in the anterior part of the eyeball. By the retrobulbar injection of 2 or 4 cc. of saline or novocaine, an artificial proptosis is produced which frequently aids in x-ray diagnosis.

For successful removal of an intra-ocular foreign body accurate localization is most important. Some of the obstacles to accurate localization are described by Spackman.[4] The roentgenologist and the ophthalmologist must thoroughly understand each other's problem. For magnetic intra-ocular foreign bodies, the Berman locator[5] offers a tremendous help, and because of its portability it can be used in places where an x-ray is not available.

The question of a "double perforation" of the eyeball can be frequently answered by injecting air[6] into Tenen's capsule to produce proptosis and thus create an area surrounding the eyeball of different density to the x-ray.

Localization of the intra-ocular foreign body can be accomplished by the Modified Sweet Method[4] or by the Comberg[7] Contact Lens. Thorpe[8] has devised a plastic contact lens by having suture holes drilled in it so that the lens can be sutured to the ipiscleral tissue. Frequently stereoscopic films are necessary.

Magnetic or Non-Magnetic Foreign Body.—In the operating room, the ophthalmologist must determine whether the intra-ocular foreign body is magnetic or non-magnetic. Thorpe has pointed out that the magnet should not be used to differentiate this since there is a possibility that the intra-ocular foreign body might be pulled into tissues which would interfere with its removal. The Berman Locator readily differentiates a magnetic from a non-magnetic intra-ocular foreign body.

If the anterior segment of the eyeball is intact and the foreign body is in the vitreous, it should be removed by posterior sclerot-

omy. It is obvious that removal by the anterior route would result in damage to the lens, suspensory ligament and ciliary body in such cases. The posterior route, as a rule, is preferable as offering the minimum risk except for those small foreign bodies not lying against the ciliary body. When x-ray localization is impossible, tiny foreign bodies may be removed by the anterior route without material damage. Intra-ocular foreign bodies, as large as 2 to 4 mm. in diameter, can usually be removed without enucleation, and leave a fairly good-looking though sightless eye. Intra-ocular foreign bodies, of 0.5 to 2 mm. in size, generally leave a useful eye after removal. It is imperative that diathermy punctures be made prior to the scleral incision when the posterior route is chosen. Of course, foreign bodies in the anterior chamber and iris should be removed through a keratome incision at the limbus. Donovan[9] uses a spinal puncture needle, with a syringe for suction, to remove a small foreign body located in a traumatic cataract.

Spaeth has emphasized that the giant magnet has a diffuse magnetic field which can be varied, while the hand magnet has its only indication in cases where the tip can be applied directly or approximated to the foreign body at an interval no greater than 2 mm. In work with magnetic apparatus it is a refinement to have non-magnetic instruments.

Non-magnetic intra-ocular foreign bodies in the vitreous offer a greater difficulty for removal. If the vitreous is clear the Thorpe ophthalmic endoscope[10] or the biplane fluoroscope method as practiced by Cross[11, 12, 13, 14] may be used. The Thorpe endoscope was found to be a failure in two cases at the National Naval Medical Center. It was felt that the instrument and the sclerectomy opening were too large. If the vitreous is cloudy, one can use only the biplane fluoroscope. Special grasping instruments have been devised by Thorpe and Cross.

Non-magnetic foreign bodies anterior to the vitreous can be removed by forceps through a corneal incision. If embedded in the iris, an associated iridectomy is done. Those in the lens can be removed if and when the cataractous lens is extracted.

The consensus now is that non-magnetic intra-ocular foreign bodies should be left in situ if they are not easily accessible. The question is wholly one of sympathetic ophthalmia. A sterile,

chemically inert foreign body is usually harmless and becomes encysted. A wound involving incarceration of the ciliary body is dangerous.

The biplane fluoroscope is a large cumbersome instrument which is not generally available throughout the country. Borley and Leef[15] have extracted a non-magnetic intra-ocular foreign body by using an ordinary x-ray machine for the vertical x-rays and a portable x-ray machine for the horizontal x-rays. This method should extend the use of the biplane fluoroscope. Too many eyes are lost because of the failure to attempt removal of non-magnetic intra-ocular foreign bodies.

Sympathetic Ophthalmia

Not one case of blindness from sympathetic ophthalmia was recorded from the American Expeditionary Forces in 1917–1918. Greenwood[16] accounted for this in three ways:

1. All eyes so badly injured anteriorly that a useful eye could not be expected were enucleated.

2. Less devastating anterior injuries were treated antiseptically and often the wounds were sealed by a conjunctival flap, with the result that healing took place without subsequent iridocyclitis.

3. Enucleation was done in all cases of persistent iridocyclitis. The reason for the lowered incidence of sympathetic ophthalmia in the military life rather than the civilian life is that patients in civilian life are apt not to allow enucleation of an eye which, by reason of traumatic iridocyclitis, endangers the fellow eye, while in military life such eyes are removed at once.

In the Navy, in World War II, we have had five cases of sympathetic ophthalmia diagnosed following intra-ocular foreign bodies. Penicillin was used in two of these cases without avail. The injured, sympathogenic eyes were removed in all cases and useful vision was preserved in the sympathetic eye.

In World War I, of 48,290 patients with war injuries admitted to a casualty station, 1.54 per cent suffered from injuries to the eye. Of these, 0.8 per cent were classified as serious. In this war, in the calendar year 1941, there were 16,730 patients admitted into Naval hospitals for eye conditions. Of these, 2.75 per cent were traumatic injuries to the eye. In the calendar year 1942, 39,707 patients were

admitted and 2.38 per cent were traumatic injuries to the eye. We see, therefore, that almost 1 per cent more eye injuries are seen in World War II than in World War I.

In conclusion, it would seem that with greater technological advance in warfare, the eye seems to be more susceptible to injury.

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Routine Eye Examination of School Children

Frank E. Burch, M.D.

THIS plan for nurses and teachers has been promoted extensively by the Minnesota Society for the Prevention of Blindness, as one of its projects.

Objectives

In a campaign for sight conservation in school, it is important to determine defective vision, eye disease, and the possibilities of their correction among school children, and to analyze results for guidance of school authorities, teachers, nurses, and the public.

Methods

It is necessary to secure active cooperation among superintendents, parents and teachers, and the examining nurses and eye physicians. Parents and teachers often know of certain pupils suffering from symptoms due to eyestrain, or who are actually lacking in visual acuity. They may have observed that certain children hold their books too close, sit in a stooping position at the desk, are not able to see the chalkboard, are backward, or make mistakes in reading. Teachers often note that certain children have inflammatory eye conditions, are cross-eyed, or are able to see with only one eye. These pupils should be critically examined.

Older-age pupils can thoroughly understand what one is trying to accomplish. Some of them will volunteer information about their eyes which may be pertinent. For those who are already wearing corrective glasses, it is important to learn when and where the correction was obtained, the thoroughness of examination, how long correcting lenses have been worn, and whether they have accomplished the purpose for which they were intended.

Although a child may have normal visual acuity, evidence of ocular fatigue (asthenopia) may be outstanding. Such symptoms are headaches, frowning, blurred vision at times, blinking and rubbing the eyes, frequent styes, twitching of the eyelid muscles, etc. It is important to differentiate between external eye diseases due to eyestrain and those produced by infection, malnutrition, or uncleanliness. Parents objecting to an eye examination and visual test of any pupil may be persuaded by an explanation as to the purpose of the examinations and the benefit to the child. Many will arrange for an eye examination by an ophthalmologist of their own choice.

History

The record should include any history of previous accident or inflammation, ulcers of the cornea, any record of night or color blindness which can be ascertained, and other pertinent history bearing on the eye examination. The teacher's rating of the mentality or school progress of the child and any peculiar habit trait should be noted. Also, it is important to learn whether familial traits exist, and whether other members of the family—parents or siblings—have eye defects. This is particularly true of myopia or nearsightedness, cross eyes, cataracts, or congenital defects.

Vision Testing

Snellen's long-distance chart should be used (for those who can read), followed by a test and recording of near vision with a reading chart at 15 inches. For younger children who do not know their letters, the "E" chart is very necessary. In using the "E" chart, children should be instructed to turn their fingers in the direction of the limbs of the E shown. It is especially valuable for children in the lower grades, and in testing preschool children. Special testing apparatus is not necessary, and is no better than the standard Snellen charts.

Procedure.—The examining nurse should see that Snellen charts used in testing are properly illuminated; that the child does not face bright light while being tested; that the distance from the chart is 20 feet; and that *each eye is tested separately.* If a child cannot see with either eye at 20 feet he should be moved forward

until he can read the top letter of the Snellen chart at a distance from which it is clearly visible. In testing each eye separately, have the child cover but not press upon the eye which is not under test. For those children who are already wearing glasses, it is important first to take the vision separately without, and then with, glasses, but test each eye separately. Incidentally, it is of value to have teachers observe and learn standard methods of vision testing, and to leave reversible and "E" Snellen test cards in each school. Teachers can easily acquire vision testing methods, and should learn how to *record* vision, using distance as the numerator and the size of type as the denominator: i.e., 20/200, 5/200, 20/40, 20/15, etc. Near visions should be tested and recorded as the smallest size of type the child can read at 15 inches from the eye. EACH EYE SHOULD BE TESTED AND RECORDED SEPARATELY.

Muscle Tests

Eye discomfort is not necessarily dependent upon refractive errors alone. Eyestrain caused by errors of refraction are a primary consideration, but many defects are entirely muscular—known as heterophoria. The method of detecting this must be by cover test. The child looks at a fixed letter, point of light, or object, while a cover is moved from one eye to the other. The observer watches for any deviation in alignment. This test is quite as important as the vision test, and should be made for every pupil.

Records

Perfect records are important. Each blank space on the record card should be checked or filled in. It is helpful to note any physical defect, evidence of malnutrition, anemia, posture, etc. In fact, any evidence of ill health should be recorded by the nurse during routine eye tests.

Follow-Up

In cases where defective vision, muscle defect or eye disease is discovered, it is absolutely essential to have proper follow-up of cases. Parents should be notified and referred to the examining eye physician on stated days, at certain appointed centers. Children for whom spectacles or eye treatments are advised by the examin-

ing eye physician also require follow-up to make sure that such spectacles or treatments are obtained. To accomplish this, in the absence of a social worker for each school, a list of such pupils should be made for whom the examining eye physician has made definite recommendations, in order that the teacher and nurse may know whether the advice has been carried out. Children who should be wearing spectacles may lose or break them and remain without them for periods, to their detriment. The teacher's opinion should be obtained in the case of any child whose visual disability might be a factor in failure to keep up with the normal classwork. In certain instances it may be best to recomend a sight-saving class.

Recommendations

In any school survey it will be of especial interest to note the conditions of schoolroom lighting, the conditions of the chalkboard, and the type of desks used in relation to the posture of the children at the desks.

Eye surveys are not eye clinics. When defective vision, eye disease, muscle defect, or other anomaly has been checked by the examining eye physician, following a referral by the nurse, the parent will be notified by mail as to the center where further investigation can be carried out. He will be asked to consult his family doctor for treatment or referral to an ophthalmologist. If parents request it, a list of qualified ophthalmologists may be furnished. The responsibility for carrying out recommendations devolves upon the parent. The nurse and teacher can be helpful. For indigent parents or guardians, one of the free clinics should always be made available upon application or recommendation of nurse, teacher, or the family physician.

All reports should be made in duplicate, so that assembled material may be analyzed by the examining eye physician after the survey is finally completed. Thereby its educational value will be realized by teachers, school authorities, and the public, and the results made available to others. Results of surveys should be given all possible publicity.

Types, Paper, and Printing in Relation to Eyestrain*

R. B. Fishenden

STATES the value of various types, paper, and printing, and their effect on legibility.

COMFORT in reading is as important to those concerned in producing books as to the ophthalmic surgeon. Considerable work has been done on the subject by workers who have approached the subject scientifically and by those who have made type legibility a special study. Unfortunately these investigations do not appear to have been correlated, even in recent times, although instruments have been devised to measure complex "reader reactions." There are many diverse factors to be taken into account and these may lead to inaccurate conclusions if the approach is not sound.

In considering briefly some points of interest a few assumptions will be made. Illumination will be on the basis of bright diffused daylight or artificial illumination, say twenty foot-candles. The papers used are either white or lightly tinted, and the printing done in black ink.

In an early investigation on types for school books[1] sound conclusions were reached. The report was against condensed types, or narrow breadth being more important than height. It was recognised that contrast between fine and heavy strokes should be avoided. De Vinne, referring to this subject, said that "the punch cutter straining after a hair line that just stops before invisibility is ably seconded by the pressman who scantily inks these light faces."

Apart from dimensions of the letters, fine hair lines are likely to approach the visual threshold, as are serifs—although these,

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if well designed, are an aid to differences in letter forms and thus to legibility. It is evident that types which do not exhibit an extreme of contrast between thick and thin strokes will be more restful. The difference between these two groups of type design is here illustrated.

In every period there have b

In every period there have been

FIGURE 1.—The first example shows normal contrast between thick and thin lines, the second excessive contrast. The second shows the thick lines arranged vertically, while the first shows them at an angle which aids the flow of easy reading.

Well designed sans serif types have their value, as is demonstrated in the Edward Johnston poster type for London Underground and Gill Sans by Eric Gill.

An early investigator, Legros,[2] showed that there is a greater coincidence between the characters in the alphabets of some type forms. This is of more importance in figures than in letters; differences between two designs of figures are shown.

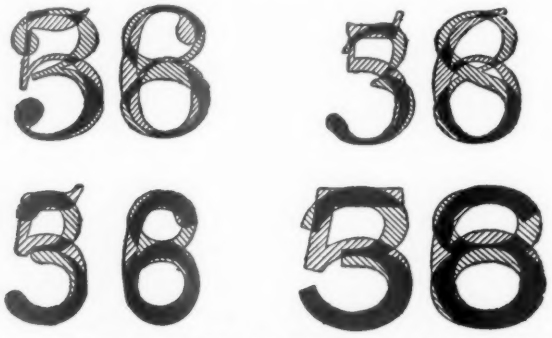

FIGURE 2.—It is sometimes considered that legibility is aided, particularly in figures, by maximum differences. The diagram shows four series, the solid black showing the coincidences. From this aspect the first is the best and the last the least successful.

In the design of types there should be no serious departure from accustomed shapes. The types for timetables have been specially studied and figures designed to provide maximum differences in

outline without departing from the recognised forms. The legibility of both figures and letters is dealt with in a report on Government Printing,[3] which advised that "types in which the contrast between the thick and thin strokes is exaggerated, or in which the face is unduly compressed, should not be used." A section of timetable figures of London Transport is here shown.

RIPPLE ROAD (Lodge Avenue)	4	52/5	12/5	32/5	42/5	52/6	12/6	32/6	52/7	12	
RIPPLE ROAD (Barking P.O.)	4	56/5	16/5	36/5	46/5	56/6	16/6	36/6	56/7	16	
EAST HAM (Town Hall)	5	05	20/5	40/5	50/6	06	20/6	40/7	07	20	
GRAYS (Queens Hotel)	6	20/6	40/7	07	25/7	40/8	08	20/8	40/9	08	
PURFLEET	6	35/6	55/7	15/7	35/7	55/8	15/8	35/8	55/9	15	

FIGURE 3.—Timetable figures are specially designed for maximum legibility. This example is regarded as one of the most successful.

Apart from configuration, the major factor in type legibility is size. Types nowadays are known by their point size, there being seventy-two points to the inch. This article is set in 11 point old style type and the heading in antique old style, a heavy type of similar character. It is usually considered sufficient to a type in which the metal is one-sixth of an inch in depth. Legibility depends on the size of the small or lower case letters, known as "x" height, and although this is well understood there are frequent misunderstandings even in official instructions. Differences in x height of the small letters in type series are shown in the following examples on the left; although "Ionic" is on a smaller body, the face is larger than "Times."

7 point Ionic 451 (SOLID)

In every period there have been better or worse types employed in better or worse ways. The better types employed in better

7 point Ionic (LEADED 3 PTS.)

In every period there have been better or worse types employed in better or worse ways. The better

8 point Times 327 (SOLID)

In every period there have been better or worse types employed in better or worse ways. The better types employed in better ways have

8 point Times 327 (LEADED 2 PTS.)

In every period there have been better or worse types employed in better or worse ways. The better types em-

FIGURE 4.—Examples on the left with the types unleaded show that the size is not related to the size of face, the smaller 7-point "Ionic" being larger than the 8-point "Times." On the right the two types have leads between the lines which markedly increases legibility.

Legibility will be reduced if the letters of words are packed too closely. The spacing between words is also important; if too close, reading is made more difficult and if too wide the appearance of the page is not so good.

The reading reactions to wide spacing between lines have been measured. Legibility is improved by inserting a space between the lines of type, called "leading," and it is a corrective for too long lines (see examples on page 53 on the right). Increased leading naturally increases the number of pages. The length of line requires to be related to the type size.

10 point Fournier 185 (SOLID)
In every period there have been better or worse types, employed in better or worse ways. The better types employed in better ways have been used by the educated printer acquainted with standards and history, directed

12 point Baskerville 169
In every period there have been better or worse types, employed in better or worse ways. The better types employed in better

12 point Times 327
In every period there have been better or worse types, employed in better or worse ways. The better types employed in better

12 point Walbaum 374
In every period there have been better or worse types, employed in better or worse ways. The better types employed in better

FIGURE 5.—These are four types, all of good design, widely used. Baskerville is a popular type for books, also Fournier and Walbaum. "Times" may be the best type for newspaper printing, and is now widely used for a variety of purposes.

There are notable differences in legibility in the design of types, a subject which has been discussed by Morison,[4] Warde,[5] Tarr[6] and others.

Times Roman is a successful modern type whose legibility is shown to advantage in small advertisements.

Visual acuity is stated to be in the order of one minute of arc in

resolving two adjacent black lines. In an illustration by the half-tone process of coarse screen as, for example, a newspaper half-tone or a half-tone poster, the angle at which the dots fail to be resolved is less than half a minute.[7] Experiment shows there is a sharp end point in the visual reaction when the individual half-tone dots cannot be resolved.[8]

SITTING ROOM, BED ROOM, use of bath room, in lady's well furnished flat, modern block; central heating, 'phone. To let to sole paying guest.—Write Box O.98724, The Times, E.C.4.

TWO large first-floor Unfurnished ROOMS in lady's well appointed house near Kensington Gardens, W.8; lift; facilities cooking; some service by arrangement; 3-4 gns. weekly.—Box 864, Brown's Advtg. Agency, S.W.1.

FIGURE 6.—Small advertisements in newspapers are an extreme test for legibility. These two advertisements are set in "Times" and show unusual clarity.

The design of type for book work embraces aesthetic consideration as well as the more mundane aspects of visibility, and this has sometimes been overlooked in investigations.[9] A well designed book type assists the eye to flow along the line and there is a marked psychological difference between such a type and one

14 point Bembo 270

In every period there have been better or worse types, employed in better or worse ways. The better types employed in better

12 point Mediaeval 136

In every period there have been better or worse types, employed in better or worse ways. The better types employed in better

FIGURE 7.—The second example, "Bembo," has some similarity to the first example in Figure 1. The type is well proportioned and the long descending characters are helpful and in contrast with the example of "Times" in Figure 5. The absence of disturbing elements and the oblique stress help easy reading. "Mediaeval" is a bad type from the standpoint of legibility; the unusual shape of some of the letters causes the eye subconsciously to halt.

which has the effect of halting the eye at each word, although the type may be legible. A happy example of a good type of this kind is here shown in contrast with a poor one. Idiosyncrasies in, or unfamiliar forms of, letters interrupt smooth reading.

The influence of paper on appearance, legibility, and the reader's comfort needs consideration. Smoothness, relative hardness of the surface, opacity, coating and gloss, are the chief factors. To ensure that a type shall print with clarity, a smooth paper, white or off-white, is preferred. A rough paper known as an "antique" or a "featherweight," sometimes used by publishers to give novels a deceptive bulk, needs more ink and pressure on the printing machine. The first effect of this rough paper is that the extra pressure and ink cause the types to print more heavily than smooth ones.

In the early days of printing damped paper was used, which enabled results to be produced with less pressure than would be necessary on a dry paper. In these conditions the types printed more heavily and it is important to remember that the types were designed for this kind of treatment; if these types are printed on a smooth paper they tend to give a spidery appearance.

One of the drawbacks of the heavy inking and pressure necessary for printing dry "antique" paper is that with small types, and even book types, there is a tendency for the type to fill in; this applies particularly in such letters as the loop of the small "e" and some types are designed to reduce this tendency to a minimum. Line illustrations, particularly those with fine detail, print better on a smooth paper.

Apart from the smoothness of a paper surface, a relatively hard one—the hardness depending on the fibres used and on the sizing —needs more pressure on the printing machine than does a soft one; a nice balance is required between the right fibre, the sizing and the surface, to ensure good printing and minimum trouble for the printer. If the right paper is chosen, half-tone illustrations with a medium fine screen, say 120 lines to the inch, can be printed adequately, and in some cases a finer screen may be used; a good example of a paper of this kind was used in the *British Journal of Ophthalmology* prior to the war.

With the introduction of paper restrictions and the need for the greatest economy, papers of light substance have been used for book work and in some cases these have lacked the required opacity. Opacity and substance are not directly related because the treatment of the fibres in making the paper has some influence,

and it is also possible to add loading material to suitable papers to increase opacity. When using a paper of low opacity eyestrain may be induced because the ink on the reverse side, and also on the next sheet, becomes apparent. This effect is known as "show through." In papers of this class the nature of the ink should be arranged so that the medium, or liquid part of the ink, does not penetrate the paper unduly. Where the ink is defective in this respect the effect is bad and the phenomenon is known as "strike through." Papers used for printing Bibles are of thin substance but they have a relatively high opacity.

Art paper comprises a body paper coated with china clay, usually bound in casein, and the paper is calendered to give it a high gloss. Papers of this kind were evolved to render adequately the detail in blocks made by the half-tone process. On uncoated papers the individual dots may be in some measure distorted, which causes the details to be poorly rendered. Such is the justification for using art papers, and they give the maximum contrast between the blackness of the ink and the whiteness of the paper coating. Apart from these technical considerations, glossy coated papers are best avoided because they are tiring for the reader.

A smooth uncoated paper has a good diffuse reflection so that whatever the angle of incidence of the light may be, there is little or no glare. Owing to its high gloss, the art paper has a high specular reflection and the tiring glare accompanying these papers will be recognised. Papers free from glare which would print half-tone blocks reasonably well were available before the war and it is felt that these papers have value on technical, physiological, and aesthetic grounds.

Given a type of high legibility, and paper of a suitable kind, the quality of the printing has a marked influence on the effect of the printed pages and on the readability. Uneven and bad inking induces eyestrain. The printability of the paper and the care exercised by the printer have a marked effect on the clarity of illustrations.[10]

These brief notes on paper refer to letterpress printing and the subject requires study in different ways when the lithographic offset and photogravure processes are used.

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Note and Comment

Annual Conference, November 25–27.—The National Society for the Prevention of Blindness is once again acceding to a popular demand to hold an annual conference in the fall. New York City has been chosen as the locale, and the three days prior to Thanksgiving Day, November 25, 26, and 27, have been set as the dates. The war years have made a gap in these opportunities to get together and exchange experiences in the field of prevention of blindness and sight conservation, and many workers have expressed a need for the renewal of these occasions. It is sincerely hoped that readers of the REVIEW will feel free to express themselves as to topics they would be interested in having incorporated in these meetings.

National Society's Institute.—Following a period in which the National Society has had many indications of the unavailability of trained prevention of blindness workers, it was considered advisable to plan an intensive institute, to be held June 10 through June 21. A number of outstanding ophthalmological and other professional representatives have consented to collaborate with the Society's staff in presenting lectures on the medical, social, educational, and historical aspects of prevention of blindness.

New Sight Conservation Material Available.—The long-awaited monograph, *Eye Health—A Teaching Handbook for Nurses*, is now off the press, and may be ordered from the National Society for Prevention of Blindness. It is a 108-paged, illustrated volume, giving basic information on anatomy and physiology of the eye, vision testing, eyes of school children, eyes in industry, and various other aspects of eye information of value to nurses and others engaged in sight conservation work. The book, which is paper-bound, sells for sixty cents.

The 1946 revised edition of the Society's *Catalogue of Publications* is also available and will be sent to anyone requesting it.

Summer Courses.—Eight universities and colleges are offering, during their 1946 summer sessions, courses, workshops, institutes, or conferences related to conservation of vision. Some of these are full courses; others are orientation courses, workshops, institutes or conferences. The following listing is in the order of the dates on which the courses begin:

University of Tennessee, Knoxville, Tenn.—June 10, 1946
Michigan State Normal College, Ypsilanti, Mich.—June 17, 1946

University of Wisconsin, Madison, Wis.—June 21, 1946
Western State Normal School, Gorham, Maine—June 24, 1946
Wayne University, Detroit, Mich.—June 24, 1946
Illinois State Normal University, Normal, Ill.—June 29, 1946
Western Michigan College of Education, Kalamazoo, Mich.—July 2, 1946
Teachers College, Columbia University, New York, N. Y.—July 8, 1946

Research Society to Meet.—The Fifteenth Scientific Meeting of the Association for Research in Ophthalmology will meet in the Mark Hopkins Hotel, San Francisco, California, Tuesday, July 2 1946.

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